

AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.



Amateur Satellite Report is endorsed by the
American Radio Relay League as the special interest
Newsletter serving the Amateur Radio Satellite Community

Number 97
February 18, 1985

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New RS Birds Undergo Ground Tests

*Special to ASR by Dex Anderson, W4KM**

"The successful operation over a period of three years of radio amateur satellites Radio 5 through Radio 8 has stimulated further work by radio electronics enthusiasts in creating new, improved on-board satellite equipment. In the volunteer space-technology laboratory of the Zhdanov Rayon radio club in Moscow city, tests have begun on one variation of on-board repeater and automatic operator "robot". The following members of the laboratory took part in creating them: A. Leonov, B. Lebedev, A. Popkov, V. Solov'yev, B. Omel'chenko, A. Savchenko, Yu. Kornilov, V. Mironov, S. Rodin and many others.

"In November of last year, in the "satellite" segment of the radio amateur 10 meter band (frequency 29.402 kHz), the "RS-9" beacon went on the air. It transmits telemetry information analogous to that sent in the airwaves from orbit by the "Radio" series of satellites. At year's end the repeater too was switched on translating the band of frequencies 145.860 to 145.900 MHz to segment 29,360 to 29,400 kHz. Many shortwavers and ultrashortwavers from Moscow and the Moscow area (UK3A, RS3A, RA3AHM, RA3AMM and others) have already made initial contacts via this repeater. The principles for use of the terrestrial repeater are the same as those now operating from space orbits. The basic principle is choice by the operator of a transmitter power level such that the translated signal level does not exceed that of the beacon signal in which case mutual interference will be minimized.

"The repeater is switched on around the clock but the robot is on the air irregularly. It transmits its own CQ on the frequency on which it should be called. Operation with the robot is conducted in accordance with the same program as with the robots of the "Radio" series of satellites."

*Translated by W4KM from an article in the 16 January 1985 issue of *Sovetskiy Patriot*, page 4, "They're Checking Out Satellites On the Ground" by B. Lebedev.

Short Bursts

- Flying to the Dayton Hamvention this year? Piedmont Airlines is offering a 35% discount on all flights to and from Dayton, Ohio for the Dayton Hamvention. The discount

is valid from 25 to 30 April and reservations must be made in advance. Call 1-800-334-8644 for further information. Thanks ARRL letter and W5YI.

- In DX news, a German Antarctic DXpedition is underway with DP0GVN operating from 71 degrees S, 8 degrees W. His downlink is most often around 145.920. Lothar will be operating this station until 1 March 85. QSL to DJ4SO.

- Although ON7HP will not be traveling to 4S7 as previously thought, word is that one of Peter's colleagues from Belgium will. Watch for an ON operating portable from Sri Lanka, 4S7 anytime during the four weeks following 6 February.

- A meeting of satellite users and interested amateurs will be held at the Fort Mason Officers club in San Francisco on 23 Feb. at 10:00 AM. Contact WB6GFJ at 415-948-5000 for further information.

- AMSAT is pleased to announce the appointment of the following new Area Coordinators and Assistant Area Coordinators. For Southern Nevada, K7ZOK; for Alabama, Asst. ACs N4HY and W4KDP; for Sacramento area, Asst. AC WA6HBV. Welcome to the "A" team, gentlemen!



Robert Staehle, President of the World Space Foundation.

ASR At 4: What Next?

With this issue, *Amateur Satellite Report*, ASR, completes its fourth year of publication. Looking now into its fifth year, the newsletter is strong, vibrant and brimming with the same enthusiasm which led to its conceptualization late in 1980.

But things have changed. A lot of ink has gone on paper since the premiere issue went to press in late February, 1981. Is that all there is to tell of nearly 100 issues? A pile of paper and a lot of ink? Tens of thousands of stamps and envelopes?

For a moment let's look back to see where we've been. Then perhaps we can best understand where we are (or should be) going with the future of ASR.

The concept of ASR grew from the notion that active satellite users required information more frequent and current than that which came in their magazine. The concept also grew from the realization that active satellite users also often required information which was too detailed or too laborious to transmit and receive verbally over the various on-the-air nets. Finally, ASR arose from the need to provide authoritative, reliable information to the AMSAT leadership itself. That is, the net operators themselves required a regular source of reliable information to interpret and tailor for the particular segment of the community they intended to serve.

In sum, ASR was intended to be a small circulation (say about 100 readers or less) newsletter which would help weave together the most active satellite users and a sizeable segment of the Area Coordinator corps as well as net operators. That's not what resulted, however!

Word soon spread widely about the new newsletter and circulation grew well beyond original expectations. Today, circulation exceeds 1000 worldwide.

One of the main intentions of ASR (*AMSAT Satellite Report* at its inception) was to highlight the excellence of its superb team of Area Coordinators and others who had manifestly improved or contributed to the amateur satellite community. So it was that the premiere issue featured none other than Michigan's veteran Area Coordinator, Dick Cotton, W8DX, of Detroit. In ASR #1 we said, "There are a few callsigns which are widely recognized on the OSCARs. Few, if any, are as well known as W8DX. Dick has obtained the uncanny ability to be the first satellite contact for a truly amazing number of amateurs. Among those whose first AO-6 contact was W8DX is practically every HQ AMSAT staffer!"

Not much has changed here, apparently. Although recently retired as an AMSAT Area Coordinator, Dick still plies the airwaves on AO-10 trawling for new calls.

In issue #2 we spotlighted another venerable DXer, JA1ANG, Harry Yoneda, an AMSAT Director, of Tokyo. Harry had first been elected to the Board some months earlier and his fortuitous trip to New York gave ASR its first meeting with this distinguished visitor from abroad. Together with JA1NET, JA1ANG had founded JAMSAT, the Japanese AMSAT organization.

Later we featured some others active (most still active) in OSCARs including: W4MID, W2BXA, VE5XU, W7US, K2ZRO, WH6AMX, W0SL, W0CY, Martha Saragovitz, VE3TW, K2KLV, W6CG, W0CA, W2FPY, Jorge Ordonez, KO5I, W6SP, WD4FAB, W0PN, ZL1AOX, W4PUJ, W2GFF. Then, with a clamor for more news content, we slowly

abandoned one of the original goals; spotlighting AMSAT's key "doers".

ASR was initially written by WA2LQQ on a rickety old IBM typewriter, vintage 1950 or so, which had a strong propensity for eating ribbons. Then in 1982 we obtained some rudimentary digital equipment thanks to the late KA2JTS who helped tremendously in getting this Rube Goldberg system up and running and keeping it running. (You can imagine the tearing irony we felt some months ago writing his obituary on the very equipment he helped establish and maintain!) Well it worked anyhow. For three years it got the job done. In the process we evolved from using the U.S. mails and the Interstate highways as delivery vehicles to electronic mail. (We logged several thousand miles at least trudging in occasionally ghastly weather from New York to Connecticut to get the ASR materials to W1XT and thence to the printer.) Recently we fulfilled a long-held dream and have added word-processing and telecommunications to our composition/editing capability thanks in large part to the thoughtful tutelage of KB2M who steered us through the labyrinthal decision process of which computer to buy.

Speed of transmission from editor to editor and to printer however, cannot compensate for one fundamental reality when it comes to ASR: There is NEVER enough time to get it done! Writing this newsletter is a voluntary act which at times seems to become too much a burden. We ask ourselves what manner of perversity, what malediction drives us to leer into the lonely night at a screen full of green characters; a screen only seen dimly now through wearied eyes teared with exhaustion. What manner indeed to leave family for the tap-tap-tap of the keyboard?

After four years the answer can be as simple or as complex as one cares to make it. There's a job here to be done; a story to be told and AMSAT members who want to KNOW. Surely that's enough. (Now would someone please explain that to our families?!)

So although the sophistication of the composition and editing equipment has improved and we can get copy through in half the time it used to take, we still have the gnawing disappointment to reckon with. That there is just not enough time in the day to do all the things that need to be done and still get the newsletter out regularly. So we find yet another way to compromise. We occasionally have double issues and occasionally have schedule slippages. On the whole though, ASR has been regular to a remarkable degree considering the workload of its staff and the pressures full-time jobs and family exert. We strive for better but are prepared to accept the current "mostly regular" as, under the circumstances, plainly the best that can be expected.

Over these four years ASR has been published we have seen a lot of history being made. We've seen the launch of OSCARs 9, 10 and 11, RS-3, 4, 5, 6, 7 and 8, ISKRA 1 and 2. We've seen the deaths of AO-7 and 8. We even had a Chicken Little contest to see when the sky (ISKRA) would fall!

We've anguished over the loss of several dear friends: W4KFC, K3ZRO, KA2JTS, W3KT, W6DOW, K3PNL.

But then we've delighted in the arrival of W3GEY's and WB2TNC's progeny.

In the future we see a slightly altered course for ASR. With the anticipated AO-10 bulletin system now spooling up and the continued hf net system which perseveres in spite of declining propagation, increased QRM and bare minimum staff levels, the past role of ASR as news carrier will be diminished slightly. The need for documented, detailed stories (such as telemetry equations) will of course continue to be fulfilled. But our new magazine *Satellite Journal* with its bimonthly cycle will help to pick up some of the slack here too.

In the near future ASR will rejuvenate one of its early features which proved so popular but which was eclipsed by the need for news items several years ago. Soon ASR will begin anew its series of mini-tutorials which many readers said they enjoyed so thoroughly. The first to appear was the landmark "Towards Liquidity" in ASR #4, 6 April 1981, which explained the benefits of a liquid propulsion system as compared to a solid fueled rocket as a kick motor. Phase IIIB (now AO-10) used a liquid bi-propellant system in contrast to the ill-fated Phase IIIA which used a solid fuel kick motor. Somewhat later ASR looked at the "First Science OSCAR" when, in ASR #13, it explained some of the features of UoSAT-1, now UoSAT OSCAR-9.

Some new tutorials we're planning include looking at why some stations on AO-10 are heard louder than others when each is running the same power; why off-pointing your circularly polarized antenna seems to change the polarization sense; why Mode L is inherently superior to Mode B; and more.

If you have some gnawing question you'd like to see addressed in a mini-tutorial, send your brief question to ASR, c/o WA2LQQ, P.O. Box 177, Warwick, NY 10990. (It will be impossible to provide personal replies to each and every question but the best ones will be answered in ASR. Others will be collected and grouped for possible later tutorials.

Thus ASR will be shifting its focus ever so slightly. We have established a viable news processing system with ASR and it is regarded as one of the primary news sources in the amateur satellite community. Moreover, the mesh of ASR with the nets, with *Satellite Journal* and other news/information systems within AMSAT is sturdy and healthy. We see the change in focus as returning now to augmenting the Space Education role we had in mind some years ago. While maintaining our primary function as news gatherers and editors, therefore, we will henceforth be slightly more inclined to investigate interesting questions which arise in the use of OSCAR satellites. We see the space education role as an adjunct to the overall role as news gatherer and editor. Thus, you will be seeing more of the "Towards Liquidity" types of mini-tutorials coming soon.

For an idea that was not given a lot a planning beyond a bare set of objectives and a meager framework of organization and tools, ASR has come a long, long way indeed. Nearly 100,000 copies have been printed. That's nearly three tons of paper. The stamps placed on these 100,000 envelopes, if laid side by side, would stretch a nautical mile. But when it comes right down to it ASR is more than a stack of paper and the ink thereon. It is the effort of a very few individuals to do the best they can for their colleagues in this terribly fascinating hobby. And if it takes squinting

through weary eyes to get it done...we'll persist for as long as we can.

Entering now our fifth year of publication we gratefully thank our readership for its loyalty and understanding when things aren't quite right (such as a lost or late issue). Most of all, though, we thank you for the opportunity of serving this fine community of ours with a meaningful vehicle for information and education! —WA2LQQ

UoSAT Bulletin-111 1st February 1985

UoSAT Spacecraft Control Centre, University of Surrey

GENERAL NEWS

The UoSAT Team says "goodbye" this week to Neville Bean (G8NOB) who will be working for an aerospace industry just down the road from UoS. Neville has been responsible for much of the groundstation data handling systems for both UoSAT's 1 & 2 and, specifically, the Particle/Wave Experiment on UoSAT-2. He has also been responsible for the day-to-day operations of UoSAT-1, which will now be taken over by Richard Macbeth (G8VLY) and Keith Fisher. Neville will, coincidentally, be working on other satellite work with UoS and we will, no doubt, maintain close contact. We all wish him well and thank him for his very hard work over the last two & half years.

UOSAT SPACECRAFT

UoSAT-Oscar-11 Operations

(See Bulletin #112 for this section.)

Much of this week's work was associated with the DCE — a report from NK6K indicates that the major accomplishments were the addition of up/down link quality tests to the DCE software, and the successful testing of the DCE interrupt structure.

Plans for the next period:

Memory checkout routines have been tested on the ground and are ready to upload as soon as s/c operations permit. The current draw baseline experiment should be ready to try later in the next week.

UoSAT Bulletin-112 8th February 1985

UoSAT Spacecraft Control Centre, University of Surrey

GENERAL NEWS

PACSAT

A meeting will be held in Washington D.C. (USA) between 9-11 March 1985 to formulate detailed proposals for the PACSAT mission and fund-raising operations. With the successful demonstration of the Digital Communications Experiment on-board UoSAT-OSCAR-11, it has now become imperative that the fundamental design philosophies, resource requirements, schedules and launch interfaces for PACSAT be defined. Perhaps the overriding problem at this

stage is the identification of funding sources — without which the technical problems become somewhat academic. The March meeting will address this problem specifically.

UoSAT SPACECRAFT

UoSAT-Oscar-9 Operations

A problem occurred in the UO-9 groundstation at UoS on 310185 which meant that we were unable to load Thursday's experiment and the weekly Bulletin until Sunday afternoon. As a consequence, we let the Bulletin run on Monday & Tuesday last week instead of the normal schedule and resumed as normal on Wednesday. The hardware problem has now been rectified and service should be back to normal.

The UoSAT-1 Experiment Schedule changed from 180185 to reflect majority interests of the user community derived from an analysis of the many reports and suggestions received during 1984.

The Bulletin/Digtalker/Telemetry mode at weekends has been changed to transmit approx 3mins of 1200 bps telemetry alternating with approx 6.5 mins of Bulletin — to make it easier to receive complete copies of the Bulletin! The Bulletin "right justification" has been removed experimentally to save space — any comments? The Digtalker experiment has been moved to Mondays where it will alternate with 1200 bps Telemetry, as it is primarily intended for educational demonstrations.

The schedule is as follows:

Friday — load Bulletin

Saturday — Bulletin/1200 bps telemetry

Sunday — Bulletin/1200 bps telemetry

Monday — DIGITALKER/1200 bps telemetry

Tuesday — CCD Camera — next week Radiation data

Wednesday — Computer check-summed telemetry

Thursday — Whole orbit telemetry survey

The 2 GHz Beacon will be in use this week.

UoSAT-Oscar-11 Operations

The re-loading of OBC software has proved more complex than anticipated and work is still under way at UoS — however progress has been made this (Fri) morning.

During a routine "whole orbit data" survey on 290185, the WOD section of the OBC software "hung up" — as has occasionally happened in the past — necessitating the OBC software to be reloaded from UoS. The OBC, in this condition, is still able to provide the data "bypass" facility but not support WOD collection. However life is never simple

and in order to reload the OBC software quickly it is necessary to re-establish the DCE "bypass" facility — which had temporarily been removed from the DCE software during tests! The DCE "bypass" therefore has to be reloaded first and then reloading of the OBC software can proceed. This has interrupted our experiment schedule on UO-11 this week, but we hope to be back in business soon.

When the OBC software has been reloaded, plans for the next period include memory checkout routines that have been tested on the ground and are ready to upload as soon as s/c operations permit. The current draw baseline experiment should be ready to try later in the following week.

The DCE has been active since May 1984 when it was configured to provide the digital "bypass" necessary to overcome the break in one of the uplink data paths that caused the communications problems just after launch last March. The provision of the "bypass" by the DCE restored UO-11 to full operations and enabled the commissioning of the spacecraft to proceed. Software was developed by G8NEF at UoS over the last few weeks to enable the 1802 OBC to assume the role of providing the "bypass" as part of its routine housekeeping functions (attitude control, whole-orbit surveys, packet communications, programmed command etc) and thus release the DCE to embark on its own experimental programme to demonstrate the feasibility of "mailbox" communications. Preliminary DCE software was developed by WA3ZIA/VE3's group in Canada in conjunction with NK6K and loaded by NK6K into the DCE on UO-11 from the USA after the OBC had assumed responsibility for the "bypass" functions on 090185.

This week's spacecraft operations:

Date	Day	Orbit	Activity/Start Time
010285	Fri	4919	uplink tests
		4920	DCE tests
		4925	telemetry
020285	Sat	4933	uplink tests
030285	Sun	4947	uplink tests, then tlm
		4954	uplink tests, then tlm
040285	Mon	4962	uplink tests, then tlm
		4963	uplink tests, then tlm
		4968	uplink tests, then tlm
		4969	DCE tests, then tlm
		4976	Uplink test messages
050295	Tue	4977	Uplink test messages DCE tests, then tlm
		4982	Uplink tests, then tlm
		4983	Uplink test messages
		4997	DCE loading tests
		4998	DCE + uplink tests
070285	Thu	5005	DCE tests
		5006	DCE tests
		5012	DCE load test
		5013	DCE load tests
080285	Fri	5020	DCE bypass tests
		5021	DCE bypass test-successful?